

REMARKS

The Examiner's recognition of Applicant's invention by the prompt allowance of claims 1-9 and 11 is gratefully acknowledged.

Claims 10 and 13 have been amended to more particularly point out the spark plug manufactured in accordance with Applicant's method includes a zinc-based plating layer that includes an end face adjacent the free-end portion of the ground electrode, and that chromate treatment is also applied to the end face. This is shown in Fig. 6C and described beginning at page 27, line 7, and also a feature described in claim 14 as originally filed.

REJECTION UNDER 35 U.S.C. § 103(a)

Claims 10 and 12 were rejected under 35 U.S.C. § 103 as unpatentable over Applicant's description in the Background of the Invention in the present application.

In the background, Applicant describes a prior method for plating a ground electrode to produce a bare free-end portion beginning at page 2, line 25 (last paragraph). A rubber tube is fitted onto the free-end portion to prevent contact with the plating solution. When the zinc-based plating layer is subsequently subjected to the chromate treatment, the rubber tube prevents the chromate treatment liquid from contacting the end face of the zinc-based plating layer that is formed adjacent the rubber tube. As a result, the end face of the zinc-based plating layer is not treated and is susceptible to corrosion, see page 10, beginning at line 21, through page 11, line 14, and Fig. 6D. In contrast, in Applicant's method, the end face is not covered by a rubber tube or the like, and so is accessible for treatment by the chromate treatment liquid.

Claim 10 is directed to Applicant's method for manufacturing a spark plug that includes forming a zinc-based plating layer on the metallic-shell assembly except the free-end portion of the ground electrode and immersing the assembly in a chromate treatment liquid. Under these conditions, the entire surface of the zinc-based plating layer is subjected to the chromate treatment. Moreover, claim 10 has been amended to more particularly point out that the chromate treatment includes the axial

end face of the zinc-based plating layer adjacent the free-end portion of the ground electrode. This is not taught or suggested by methods that use rubber tubes or the like to protect the free-end portion of the ground electrode from contact with the treating solutions. Therefore, claim 10 is not suggested by the conventional process described by Applicant.

Claim 12 is dependent upon claim 10 and not suggested by the conventional practice for the reason set forth with regard to that claim.

Therefore, it is respectfully requested that the rejection of claims 10 and 12 under 35 U.S.C. § 103 be reconsidered and withdrawn, and that the claims be allowed.

Claims 13-15 were rejected under 35 U.S.C. 103 as unpatentable over Applicant's description in the background of the invention in view of U.S. Patent 4,581,558, issued to Takamura et al. in 1986.

As discussed herein with regard to the rejection of claim 10, the conventional practice described by Applicant uses rubber tubes to prevent chromate treatment of the end face of the zinc-based plating layer. Takamura describes a spark plug that includes a metal chip welded to the electrode. However, Takamura et al. does not describe applying a zinc-plating layer or a chromate layer to the ground electrode or, more particularly, to the root-end portion of the ground electrode. Thus, Takamura et al., whether alone or in combination with the convention practice, cannot suggest Applicant's invention.

Claim 13 is directed to Applicant's spark plug that includes a zinc-chromate layer covering the root-end portion of the ground electrode. The claim as filed clearly recited that the zinc-based plating layer was covered by the chromate layer, which would include covering the end face. Nevertheless, Applicant's have amended the claim to more particularly point out that the chromate layer covers the end face of the zinc-based plating layer adjacent the free-end portion of the ground layer. Nothing in Applicant's Background discussion or in Takamura et al., suggests a spark plug wherein the chromate treatment is applied to the end face of the zinc-based plating layer. Therefore, Applicant's spark plug as set forth in claim 13 is not shown by the

prior art.

Claim 14 is directed to Applicant's spark plug, wherein the root-end portion of the ground electrode is covered by a zinc-based plating layer and a chromate layer. The claim particularly points out that the chromate layers covers the axial end face of the zinc-based plating layer. The conventional method described by Applicant in the Background does not achieve this result. Moreover, Takamura et al. does not make up the deficiency. Therefore, the art relied upon in the rejection does not suggest Applicant's spark plug set forth in claim 14, or in claim 15 dependent thereon.

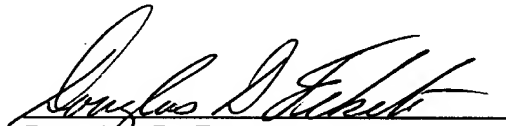
CONCLUSION

The conventional process uses rubber tubes to prevent treatment of the free-end portion of the ground electrode and so does not provide chromate treatment of the end face of the zinc-based plating layer formed against the rubber tube. Applicant's method provides chromate treatment of the entire surface of the zinc-based plating layer, including the end face. For the reasons set forth herein, it is respectfully requested that the rejection of claim 10 and 12-15 be reconsidered and withdrawn, and that the claims be allowed, together with already allowed claims 1-9 and 11, and that application proceed to issue.

It is believed that a full and complete response has been made to the outstanding Office Action, Applicant submits that only allowable claims remain pending, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (734) 302-6000.

Respectfully submitted,

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